(16)

No. 96-188

In the Supreme Court of the United States

OCTOBER TERM, 1996

GENERAL ELECTRIC CO., ET AL., PETITIONERS

v.

ROBERT K. JOINER AND KAREN P. JOINER

ON WRIT OF CERTIORARI
TO THE UNITED STATES COURT OF APPEALS
FOR THE ELEVENTH CIRCUIT

BRIEF FOR THE UNITED STATES AS AMICUS CURIAE SUPPORTING PETITIONERS

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QUESTION PRESENTED

Whether the court of appeals applied an erroneous standard of appellate review of a federal trial court's decision to admit or exclude expert scientific evidence.

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INTEREST OF THE UNITED STATES

As we explained in our brief as amicus curiae in *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), the United States is a party to a far greater number of civil cases nationwide than "even the most litigious private entity." *United States* v. *Mendoza*, 464 U.S. 154, 159 (1984). The government is also solely responsible for the enforcement of federal criminal laws. Because of the great diversity of its civil and criminal litigation, the government finds itself supporting the admissibility of scientific evidence at trial in some cases and opposing it in others. Moreover, the existence of clear standards for appellate review of particular issues materially assists the Solicitor General in determining whether to authorize appeals from adverse decisions in government

cases. See *id.* at 160-161. The United States therefore has a significant interest in the articulation of a clear, principled, and nationally applicable standard for appellate review of decisions to admit or exclude scientific evidence at trial in federal court.

STATEMENT

1. At 37, respondent Robert Joiner developed a small-cell cancer of the lung. Pet. App. 38a. Respondents sued petitioners on the theory that early onset of the disease was caused by exposure to polychlorinated biphenyls (PCBs) and to PCB-derived polychlorinated dibenzofurans (furans) and polychlorinated dibenzodioxins (dioxins) contained in products manufactured by petitioners (*id.* at 35a-36a, 39a).

From 1973 until the time of trial, respondent worked as an electrician for the City of Thomasville, Georgia. Pet. App. 35a. Although the technology used in the city's electrical transformers should have made them free of PCBs throughout his employment, testing conducted between 1983 and 1993 revealed that approximately 20% contained PCBs at a level recognized as contaminating by the Environmental Protection Agency.[1] *Id.* at 36a-37a. Respondent alleged that he was exposed to PCBs or their derivatives while maintaining the city's transformers, through contact with the fluid used to cool and insulate them or with fumes released when transformer cores were "baked off" under high heat. *Id.* at 37a.

2. The district court granted summary judgment for petitioners. Pet. App. 34a-69a. The court recognized a factual dispute over whether respondent was

[1] See 40 C.F.R. 761.3 (*s.v.* "PCB-Contaminated Electrical Equipment"). Since 1978, the manufacture, sale, and use of PCBs has been severely restricted and subject to regulation by the EPA. See 15 U.S.C. 2605(e)(2)(A); 40 C.F.R. Pt. 761.

exposed to PCBs (*id.* at 44a), but held that there was insufficient evidence to raise a genuine issue of fact concerning exposure to furans or dioxins (*id.* at 49a, 51a). The court found no evidence that furans were created in the "bake off" process or through transformer fires, because respondent had not shown that either situation produced the necessary temperatures. *Id.* at 49a. The court also found respondents' evidence insufficient to raise a factual issue concerning whether dioxins were present in the transformer fluids with which respondent had worked. *Id.* at 49a-51a.

The court held (Pet. App. 51a-68a) that expert testimony proffered by respondents to establish that PCB exposure caused the onset of Robert Joiner's lung cancer was inadmissible under Federal Rule of Evidence 702, as construed by this Court in *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). The court concluded that the testimony did not "fit" the facts of this case, because the experts' opinions concerning causation were "inextricably bound up with [their] assumption that [respondent] was exposed to furans and dioxins" (*id.* at 53a)—an assumption the court had held lacked evidentiary support. *Id.* at 57a.

The court further held that the proffered opinions would be inadmissible even without that assumption, because they were not sufficiently reliable under *Daubert*. Pet. App. 58a-67a. The court rejected the experts' reliance on two animal studies because respondents did not demonstrate the applicability of those studies to human beings or to PCB exposure at the level relevant to respondents' case. *Id.* at 58a-62a. After considering the epidemiological studies cited by respondents (*id.* at 62a-67a), the court concluded that they were "equivocal or not helpful to [respondents]"

(*id.* at 63a). In sum, the court was "not persuaded by a preponderance of proof that the studies [cited by respondents] support the 'knowledge' the experts purport to have, i.e., that PCBs, to a reasonable degree of medical certainty, promote small cell lung cancer in humans." *Id.* at 67a (citation and internal quotation marks omitted). Because "[t]he analytical gap between the evidence presented and the inferences to be drawn on the ultimate issue" of causation was "too wide," the court concluded that the proffered expert opinions did not "rise above subjective belief or unsupported speculation," and were not admissible. *Ibid.*

Because, in the absence of expert opinions, respondents had submitted no tenable evidence of causation, the district court granted petitioners' motion for summary judgment. Pet. App. 68a.[2]

3. The court of appeals reversed. Pet. App. 1a-16a. With regard to the district court's evidentiary ruling, the court first noted that "[a] district court's ruling on the admissibility of evidence is reviewed for abuse of discretion," but it then held that, "[b]ecause the Federal Rules of Evidence governing expert testimony display a preference for admissibility," it would "apply a particularly stringent standard of review to the trial judge's exclusion of expert testimony." *Id.* at 4a.

The court did not separate its discussion of summary judgment and admissibility issues. Considering

[2] The court further noted its belief that "no reasonable juror could find that PCBs caused [Robert] Joiner's lung cancer given the flawed nature of [respondents'] experts' opinions," so that "[s]ummary judgment for [petitioners] would be in order even if" the expert testimony were admissible. Pet. App. 67a n.29.

first the question of "reliability" under *Daubert*, the court recited the qualifications of respondents' experts, described their general methodology, and noted that each had "asserted the general acceptance of the procedures [he] employed." Pet. App. 8a-11a. The court acknowledged that "[t]he assessment of reliability also involves reviewing the basis for an expert's opinion" (*id.* at 11a), but it criticized the district court for rejecting the experts' reliance on the cited animal studies (*id.* at 11a-12a), for limiting its consideration to the studies discussed in the district court's opinion (*id.* at 12a-13a), and for "accept[ing] [petitioners'] criticisms of the conclusions reached in those studies" (*id.* at 13a). In the court of appeals' view, the district court exceeded proper bounds by ruling on the "correctness" of the proffered expert opinions. *Ibid.*

With respect to "relevance" under *Daubert*, the court held that the opinions of respondents' experts did not depend on exposure to furans or dioxins and that, based on its review of the record, there "appear[ed] to be a genuine factual dispute as to whether PCBs alone can cause cancer." Pet. App. 14a. The court also held that a genuine dispute did exist over "whether furans and dioxins could have been present" in the fluids to which respondent was exposed (*id.* at 14a-15a), because one of respondents' experts had stated that the "baking off" process might reach a temperature of 700-800 degrees centigrade. The court concluded that "the testimony of [respondents'] experts was erroneously excluded and summary judgment should not have been granted." *Id.* at 16a.

Judge Birch concurred "specially" (Pet. App. 16a-17a), on the ground that the court's opinion "properly emphasize[d] the role of the district court as 'gate-

keeper'" with respect to proffered scientific testimony. Judge Smith dissented (*id.* at 17a-30a), concluding that the "trial court properly applied *Daubert* and did not abuse its discretion in ruling certain expert testimony inadmissible." *Id.* at 29a-30a.

SUMMARY OF ARGUMENT

The question in this case is what standard an appellate court should use in reviewing a district court's decision to admit or exclude expert scientific testimony. No statute or rule directly answers that question, but several considerations suggest that such a decision should be reviewed only for abuse of discretion. First, the text of Rule 702 of the Federal Rules of Evidence suggests that result. Second, trial courts are generally accorded wide discretion in determining the admissibility of evidence, and there is no justification for a basically different rule here. Third, institutional factors counsel in favor of deferential review. The preliminary assessment of proffered scientific evidence required by Rule 702 will often require a detailed and fact-specific analysis, made in the context of a particular case and at a particular point in the proceedings. The district court is better positioned to undertake that analysis. Moreover, there is no reason to believe that appellate judges will be systematically better able to evaluate the relevance or reliability of scientific testimony in close cases. Thus, the incremental accuracy that might be achieved through review under a standard more stringent than abuse of discretion would not likely be worth the costs that such review would entail.

Discretionary decisions, however, are not left to a district court's inclination, but to its judgment, and the courts of appeals have an important role to play in

ensuring that that judgment is appropriately exercised. Appellate courts may always correct material errors of law or clear errors of fact, because basing a decision on either type of error will always be an abuse of discretion. In other cases, the district court may have failed to exercise its discretion, in which case some appellate remedy will generally be appropriate. Sometimes, it will be appropriate for a court of appeals to review an accumulated body of knowledge and experience and to rule that a particular type of evidence is generally either acceptable or unacceptable as a categorical matter. Finally, the court of appeals must ensure that the district court's discretionary determinations in any case stay within the limits of permissible judgment. Those limits defy concise definition. Bearing in mind the institutional considerations we have mentioned, however, the court of appeals should be reluctant to undertake an extensive independent examination of the issues or record involved, and wary of concluding that it is in a better position than the district court to evaluate the reliability and relevance of proffered evidence in the context of a particular case.

Application of these principles to this case is complicated by the fact that the district court's grant of summary judgment was based only in part on its exclusion of respondents' experts' opinions concerning causation. Even if we assume, however, that the court of appeals correctly held that the case presented a genuine factual issue with respect to exposure to furans and dioxins, the district court's judgment should have been affirmed. That court did not base its decision with respect to causation on any clear error of fact, and it undertook the proper

inquiry with respect to respondents' scientific evidence. Although the question will always be a close one in any case in which the standard of review is likely to make a difference, we think the district court's conclusion that the proffered evidence was not sufficiently relevant or reliable to be admitted to prove the ultimate issue of causation was a permissible one. The court of appeals therefore should not have disturbed it on appeal.

ARGUMENT

I. A TRIAL COURT'S DECISION TO ADMIT OR EXCLUDE SCIENTIFIC EVIDENCE SHOULD BE REVIEWED FOR ABUSE OF DISCRETION

As this Court explained in *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 597 (1993), the Federal Rules of Evidence "assign to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand." In other words, they give the judge "the responsibility for keeping 'junk science' out of the courtroom." *Wilson* v. *City of Chicago*, 6 F.3d 1233, 1238 (7th Cir. 1993), cert. denied, 511 U.S. 1088 (1994). In discharging that "gatekeeping role" (*Daubert*, 509 U.S. at 597), a district court must (i) understand the requirements of the Rules, as interpreted by this Court in *Daubert*; (ii) find any facts necessary to decide threshold issues relating to admissibility (see Fed. R. Evid. 104(a)); and (iii) make "a preliminary assessment of whether the reasoning or methodology underlying the [proffered] testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue" (*Daubert*, 509 U.S. at 592-593). The question

presented in this case is how an appellate court should review the district court's determinations.[3]

No statute or rule directly answers that question. Several considerations suggest, however, that an appellate court should not substitute its judgment for that of the district court on these issues, but should instead determine whether, under governing legal principles, the trial court has abused its discretion.

1. The Federal Rules of Evidence are to be interpreted like any other statute. *Daubert*, 509 U.S. at 587. Rule 104(a) provides that "[p]reliminary questions concerning * * * the admissibility of evidence shall be determined by the court." See *id.* at 592 & n.10. This Court has observed elsewhere that, when Congress explicitly commits an issue to decision by "the court," rather than simply providing a rule of decision, the statutory formulation "emphasizes the fact that the determination is for the district court to make, and thus suggests some deference to the district court on appeal." *Pierce* v. *Underwood*, 487 U.S. 552, 559 (1988) (construing 28 U.S.C. 2412(d)(1)(A)). The same is true here.

2. As a general matter, "[a] district court is accorded a wide discretion in determining the admissibility of evidence under the Federal Rules." *United States* v. *Abel*, 469 U.S. 45, 54 (1984).[4] This Court has

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[3] It is possible to articulate a standard of review for each part of the overall inquiry. See, *e.g.*, Pet. App. 18a (Smith, J., dissenting). It is simpler, however, to treat errors of law or fact as aspects of abuse of discretion, as this Court has done in other contexts. See pages 17-19, *infra*; *Cooter & Gell* v. *Hartmarx Corp.*, 496 U.S. 384, 399-405 (1990).

[4] Before the adoption of the Rules, this Court had indicated that deferential review was appropriate for rulings concerning the admissibility of expert testimony. *Salem* v. *United States Lines Co.*, 370 U.S. 31, 35 (1962) (dictum) ("[T]he trial judge

applied that principle specifically to rulings determining relevance (Rule 401) and balancing probative value against the risk of unfair prejudice (Rule 403). *Id.* at 54-55; *Old Chief* v. *United States*, 117 S. Ct. 644, 647 n.1, 651 n.7 (1997). "Relevance" is a central part of the inquiry concerning the admissibility of scientific evidence under Section 702. *Daubert*, 509 U.S. at 587, 591, 597. Similarly, because of the powerful and potentially misleading nature of scientific evidence, a district court will typically "exercise[] more control over experts than over lay witnesses" under Rule 403. *Id.* at 595 (quoting Weinstein, *Rule 702 of the Federal Rules of Evidence Is Sound; It Should Not Be Amended*, 138 F.R.D. 631, 632 (1991)). In the case of scientific evidence, the court's determinations regarding probative value and unfair prejudice under Rule 403 are likely to be closely related to its determinations, under Rule 702, concerning reliability and relevance. It would make little sense to apply a basically different standard of appellate review to one set of decisions than to the other.

For similar reasons, there is no force to the court of appeals' assertion (Pet. App. 4a) that the Rules manifest a "preference for admissibility." While the Rules may have a "liberal thrust," manifested in this context by "relaxing the traditional barriers to 'opinion' testimony" (*Daubert*, 509 U.S. at 588), *Daubert* itself demonstrates that no general rule justifies the admission of scientific testimony that is not reliable or does not "fit" the case at hand. Moreover, whatever the rule at trial, a general "preference

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has broad discretion in the matter of the admission or exclusion of expert evidence, and his action is to be sustained unless manifestly erroneous."); *Spring Co.* v. *Edgar*, 99 U.S. 645, 658 (1878) (dictum) (same).

for admissibility" operative at the appellate level would preclude reviewing courts from ever deferring to rulings excluding evidence. That has plainly never been the rule.

3. This Court has frequently recognized that the standard of appellate review appropriate to a particular sort of decision may depend on "the respective institutional advantages of trial and appellate courts." *Salve Regina College* v. *Russell*, 499 U.S. 225, 233 (1991); see also *Koon* v. *United States*, 116 S. Ct. 2035, 2046-2048 (1996); *Ornelas* v. *United States*, 116 S. Ct. 1657, 1662-1663 (1996); *Cooter & Gell* v. *Hartmarx Corp.*, 496 U.S. 384, 399-405 (1990); *Pierce*, 487 U.S. at 559-561; *Miller* v. *Fenton*, 474 U.S. 104, 112-118 (1985). In our view, district courts are better positioned than appellate courts to make the preliminary assessment of scientific validity and factual relevance required by *Daubert* (see 509 U.S. at 592-593).

a. That assessment will frequently require a detailed analysis of the nature of the proffered evidence; the scientific and factual premises on which it rests; whether those premises are well established, conjectural, or something in between; and what logical chain of reasoning connects general knowledge or principles to the facts and circumstances that a party proposes to establish in the particular case before the court. See generally *Daubert*, 509 U.S. at 593-595. To inform its analysis, the district court may seek clarification or hear argument from the parties; and in close or complicated cases it may examine the proffered experts, or even seek the assistance of an independent expert of its own choosing. See *id.* at 595; Fed. R. Evid. 706.

Based on its inquiry, the court must decide whether proffered scientific evidence is or is not

"scientific * * * knowledge" for purposes of Rule 702—that is, whether or not the proposed inferences or assertions are scientifically derived and "supported by * * * 'good grounds,' based on what is known." *Daubert*, 509 U.S. at 590. That decision is essentially a factual one. The court must also decide whether the evidence will "assist the trier of fact" (Fed. R. Evid. 702). That question, which "goes primarily to relevance," is "one of 'fit'" between the proffered evidence and the facts and issues of the case before the court. *Daubert*, 509 U.S. at 591.

To the extent that the judicial assessment of reliability and relevance required under *Daubert* rests on an essentially factual inquiry, it is the product of a process in which district courts have "unchallenged superiority" over courts of appeals. *Salve Regina*, 499 U.S. at 233; see *Anderson* v. *City of Bessemer City*, 470 U.S. 564, 574-575 (1985). To the extent that the inquiry is intertwined with legal issues (as, for instance, in assessing relevance), the district judge, who is "[f]amiliar with the issues and litigants" (*Cooter & Gell*, 496 U.S. at 402), and who is intimately involved with the case *at the time that the relevant assessment must be made*, will generally be "better situated than the court of appeals to marshal the pertinent facts and apply the fact-dependent legal standard" (*ibid.*). See also *id.* at 403-404; *Pierce*, 487 U.S. at 560-561; compare *Daubert*, 509 U.S. at 591 (discussing evidentiary "fit"). For these reasons, the question of admissibility of proffered scientific evidence seems to us more like the appropriateness of Rule 11 sanctions, at issue in *Cooter & Gell*, or whether a legal position taken during litigation was "substantially justified," considered in *Pierce*, 487

U.S. at 561, than like the questions of controlling substantive law at issue in *Salve Regina*.[5]

b. A decision on expert testimony may itself have a significant impact on the length, nature, and cost of an action. It may also shape other important decisions by the court and the parties. Thus, it will often be an integral part of the district court's overall supervision and management of the litigation. Such supervisory decisions, like factual or heavily fact-dependent determinations, have typically been left to the district court's sound discretion. See *Salve Regina*, 499 U.S. at 233; *Cooter & Gell*, 496 U.S. at 404; *Pierce*, 487 U.S. at 558 n.1. Often, they may be disturbed on appeal only at significant cost, not only in terms of the immediate action (which will presumably have to be tried or retried on remand), but in broader systemic terms as well.

As this Court has emphasized, when an appellate court reviews factual findings,

> [t]he rationale for deference to the original finder of fact is not limited to the superiority of the trial judge's position to make determinations of credibility [of witnesses]. The trial judge's major role is the determination of fact, and with experience in

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[5] Plenary appellate review of certain factual or "mixed" questions may be appropriate when the issue involved is one of transcendent constitutional importance, or when a constitutional standard can "acquire content only through application." *Ornelas*, 116 S. Ct. at 1662 ("probable cause" and "reasonable suspicion"); *Hurley* v. *Irish-American Gay, Lesbian & Bisexual Group of Boston*, 115 S. Ct. 2338, 2344 (1995) (whether conduct is expressive for First Amendment purposes); *Miller* v. *Fenton*, 474 U.S. at 112-118 (whether confession was "voluntary"); *Bose Corp.* v. *Consumers Union of United States, Inc.*, 466 U.S. 485, 502 (1984) ("actual malice"). Those concerns are not present in this context.

> fulfilling that role comes expertise. Duplication of the trial judge's efforts in the court of appeals would very likely contribute only negligibly to the accuracy of fact determination at a huge cost in diversion of judicial resources.

Anderson v. *City of Bessemer City*, 470 U.S. at 574-575. The same will be true of most determinations with respect to admissibility under Rule 702. Threshold determinations of the admissibility of evidence of all kinds are an ordinary incident of the trial judge's role, and "with experience * * * comes expertise." The details of a particular scientific theory, study, or technique may be unfamiliar to the district court, but the principles of relevance and reliability are not. There is, moreover, no reason to think that the scientific details pertinent to a particular case will be any more familiar to the judges who sit on the courts of appeals.

This point must be emphasized, for it has been argued that "more stringent" review is appropriate in the context of scientific evidence because "evaluating the reliability of scientific methodologies and data does not generally involve assessing the *truthfulness* of the expert witnesses and thus is often not significantly more difficult on a cold record." *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 749 (3d Cir. 1994), cert. denied, 115 S. Ct. 1253 (1995); see Pet. App. 4a-5a. That argument underestimates the value of a district court's ability to evaluate the "credibility" of a witness, including an expert witness at a hearing on admissibility.[6] Even with respect to cases decided

[6] In the case of expert witnesses, "credibility" involves considerably more than "truthfulness." Some experts are zealous in pursuit of the truth, while others may be zealous primarily in pursuit of some personal, professional, or political agenda. Some may lack perceptible zeal. Such qualities tend to emerge in live testimony. They are often harder to perceive or evaluate on a "cold record."

purely on a paper record, however, the argument slights the role of the district court in the overall judicial "project of reaching a quick, final, and binding legal judgment" (*Daubert*, 509 U.S. at 597). The pertinent point is not that appellate courts are less competent to evaluate scientific evidence than the district court, but that there is little reason to think they will be systematically any *more* competent to do so.

No judge may be presumed to have pre-existing familiarity with whatever principles, techniques, or other technical background material may be relevant to the scientific evidence offered in a particular case. The district court must expend whatever resources are necessary to achieve sufficient familiarity to discharge its responsibilities under Rule 702. Similarly, the judges of the court of appeals must familiarize themselves with the relevant materials to the extent necessary to review a challenged ruling on admissibility.

At the appellate level, however, there will often be a significant difference between the effort required to conclude that the district court discharged its duty of inquiry and reached a permissible decision, and the effort required to subject the trial court's decision to a "hard look" (*In re Paoli R.R. Yard*, 35 F.3d at 749) or to "particularly stringent * * * review" (Pet. App. 4a). See also *Pierce*, 487 U.S. at 560 ("[E]ven where the district judge's full knowledge of the factual setting can be acquired by the appellate court, that acquisition will often come at unusual expense."). Because the courts of appeals sit in panels,

that incremental cost must be multiplied by three. Finally, because an abuse-of-discretion standard will already, by hypothesis, result in the correction of evidentiary errors that are both serious and prejudicial, the benefits to be derived from "particularly stringent" review are only those that may arise from changing permissible decisions to preferable ones. Thus, the "[d]uplication of the trial judge's efforts in the court of appeals [will] very likely contribute only negligibly to the accuracy" of rulings under Rule 702, "at a huge cost in diversion of judicial resources." *Anderson*, 470 U.S. at 574-575; compare *Salve Regina*, 499 U.S. at 231-233 (independent appellate review on controlling questions of substantive law).

Deference to the trial court's evidentiary rulings, like deference to its rulings under Rule 11, will tend to enhance the ability of "courts on the front lines of litigation * * * to control the litigants before them," and will "discourage litigants from pursuing marginal appeals, thus reducing the amount of satellite litigation." *Cooter & Gell*, 496 U.S. at 404. "Stringent" or "hard look" review (Pet. App. 4a), on the other hand, risks turning the district court's consideration of scientific evidentiary issues into "a 'tryout on the road,'" with appellate briefing and argument "the 'main event.'" *Anderson*, 470 U.S. at 575 (quoting *Wainwright* v. *Sykes*, 433 U.S. 72, 90 (1977)).[7] Appellate courts have an important role to

[7] See the 67-page opinion in *In re Paoli Railroad Yard PCB Litigation*, which originated the "more stringent review" standard adopted by the court of appeals in this case (Pet. App. 4a-5a). Compare the recent decision by the same court in *In re Paoli Railroad Yard PCB Litigation*, No. 95-2098 (3d Cir. May 12, 1997), slip op. 19 (according "particular deference" to

play in policing the boundaries of discretion under Rule 702 and *Daubert*, as we discuss below. That role is not, however, to afford disappointed parties an opportunity to relitigate at the appellate level close evidentiary questions appropriately considered and resolved by the district court.

II. AN ABUSE-OF-DISCRETION STANDARD ALLOWS FOR APPELLATE INTERVENTION IN APPROPRIATE CASES

Review for abuse of the district court's discretion is "not * * * an empty exercise." *Koon* v. *United States*, 116 S. Ct. at 2046. "[D]iscretionary choices are not left to a court's 'inclination, but to its judgment, and its judgment is to be guided by sound legal principles.'" *Albemarle Paper Co.* v. *Moody*, 422 U.S. 405, 416 (1975) (quoting *United States* v. *Burr*, 25 F. Cas. 30, 35 (C.C. Va. 1807) (No. 14,692d) (Marshall, C.J.)). There are several situations in which it will be appropriate for an appellate court to intervene to provide the necessary legal guidance. Although general categories can only be suggestive, and will frequently overlap, they may be usefully summarized as follows.

A. Errors Of Fact Or Law

Appellate courts are, preeminently, expositors of the law. See, *e.g.*, *Salve Regina*, 499 U.S. at 231-233. If a district court has failed to perform the sort of relevance and reliability analysis required by *Daubert*, thereby failing to discharge its "gatekeeper" role under Rule 702, then the appellate court may properly vacate the decision below and remand

district court's decision to exclude certain expert testimony under Rule 403); see page 10, *supra*.

the case with instructions to the district court to exercise its discretion under the proper legal standards. Similarly, if a trial court's decision to exclude scientific evidence can be shown to have been based on a misunderstanding of the applicable substantive law, an appellate court will be well positioned to correct the underlying legal error, and accordingly reverse or vacate the associated evidentiary ruling.[8] The

[8] This might be the case if the district court did not appreciate the relevance of proffered evidence under the governing law, or if it misunderstood the degree of scientific certainty required to satisfy an applicable legal standard. For example, the proof of causation that the plaintiff must offer in a tort action such as this one is significantly different from the demonstration of *risk* that often permits or requires government action in the environmental or public health context. Thus, important environmental statutes require government action upon a showing that a condition creates a "danger" or "risk" of specified consequences. See, *e.g.*, 42 U.S.C. 6973(a) ("imminent and substantial endangerment to health or the environment"), 9606(a) ("substantial endangerment to the public health or welfare or the environment"). Other statutes provide that facts may be established pursuant to a specified standard, even where the scientific community has not reached a uniform conclusion under that standard or where the standard itself calls for cutting-edge science or technology. See 42 U.S.C. 7475(a)(4) (requiring installation under the Clean Air Act of the "best available control technology"), 7479(3) (defining "best available control technology"), 7501(3) (defining "lowest achievable emission rate"); 21 U.S.C. 348(c)(3)(A) ("no [food] additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal"). In such circumstances, expert testimony showing that the scientific community is significantly divided would be sufficiently reliable to be admitted to establish the existence of a risk meeting the statutory standard. While the standard of appellate review in such a case would be the same, the substantive legal standard against which to assess the district court's decision would be significantly different.

same applies to clear factual errors that can be shown to have affected an evidentiary ruling (for example, a finding that a particular theory has never been subject to peer review, when the record contains three published articles on the subject in peer-reviewed journals). In such cases, the district court's error of fact or law would amount to an abuse of discretion, and would plainly be subject to correction by the court of appeals. See, *e.g.*, *Koon*, 116 S. Ct. at 2047-2048; *Cooter & Gell*, 496 U.S. at 401-402, 405; see also *United States* v. *Jones*, 107 F.3d 1147, 1150-1156 (6th Cir. 1997).

B. Failure To Exercise Discretion

An appellate court cannot review for abuse of discretion if the district judge did not exercise discretion in the first place. In a few cases the district court may so misapprehend its role, undertake so inadequate an inquiry, or offer so inadequate an explanation for its ruling on admissibility that the court of appeals will find itself unable to discern the grounds for that ruling or how they relate to the factors that the trial court was required to take into account under Rule 702 and *Daubert*. Some remedy will generally be appropriate in such cases, ranging from de novo determination of the issue (if, for example, the relevant materials are in the record, the issues are clear, and there is no other reason to remand the case) to a remand with instructions to undertake the appropriate evidentiary inquiry.

C. Categorical Determinations

One argument in favor of active appellate review of issues involving the admissibility of scientific evidence is that such review will promote a desirable uniformity in the law. That argument is not persua-

sive as a general matter, because many or most of the issues that generate significant controversy in actual cases are likely to involve unsettled scientific principles, questions of methodology or competence relating to studies or tests performed especially for a particular litigation, or the questionable application of known principles to "a particular set of events in the past." *Daubert*, 509 U.S. at 597.[9] They will therefore tend to involve the sort of "multifarious and novel question, little susceptible, for the time being at least, of useful generalization," which is best left largely to the sound discretion of the district court. *Pierce*, 487 U.S. at 562; see *Cooter & Gell*, 496 U.S. at 404-405.

There are, however, limited circumstances under which it will be appropriate for an appellate court to settle, for proceedings within its jurisdiction, a recurrent issue involving the admissibility of scientific evidence. As Judge Friendly observed, the scope of permissible discretion with respect to specific issues may appropriately narrow over time:

> The rulemakers gave the district courts discretion; but after enough of them had decided always to exercise it the same way, a way that the court of appeals deemed appropriate, the channel of discretion had narrowed, and a court of appeals

[9] The evidentiary controversy in this case, for example, involved both whether exposure to PCBs, per se, had been linked to the development of cancer in human beings (a matter of unsettled scientific principle), and whether presumably valid studies showing that PCBs, furans and/or dioxins caused certain cancers in high-dose animal studies were sufficiently relevant to Robert Joiner's individual experience to be admissible to show the cause of his cancer.

> should keep a judge from steering outside it rather than allow disparate results on the same facts.

Friendly, *Indiscretion About Discretion*, 31 Emory L.J. 747, 772 (1982). That principle will apply, in certain circumstances, to questions concerning the scientific reliability of particular theories, tests, studies, or other types of expert evidence potentially admissible under Rule 702.

Although "[s]cientific conclusions are subject to perpetual revision" (*Daubert*, 509 U.S. at 597), it is also true that "theories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice" (*id.* at 592 n.11). In the progression from novel idea to scientific "law," a particular theory or technique will undergo a process of scientific and judicial testing. In the early stages, disparate results are predictable; and, in the judicial context, there is no reason to think that appellate consideration of the first case in which admission of evidence based on a new theory is sought should control the matter for the future.

After some period of time, however, with increasing experience (both scientific and judicial), there will often come a point when the balance of efficiency tips, and an appellate court may usefully review the available evidence and conclude that a given technique, in a definable set of circumstances, is either so thoroughly established or so thoroughly discredited that further case-by-case consideration of the issue would not be a productive use of judicial resources. That result is consistent both with *Daubert* and with the general use of an abuse-of-discretion standard.[10]

[10] Of course, in any given case, the trial judge will still have to consider challenges to the way that an expert uses an

D. Exceeding The Permissible Limits Of Discretion

The foregoing bases for review are relatively easily described, and not likely to be controversial. There remains, however, the case of the district court that has understood its role, reviewed seriously the materials provided to it by the parties, analyzed without obvious legal or factual error the proffered evidence's scientific reliability and its relevance to the pending case, and reached a conclusion concerning admissibility that is seriously challenged on appeal, and that the court of appeals finds at least superficially troubling.

It is not self-evident what it means to say that a court of appeals should review such a decision for "abuse of discretion." At a minimum, that phrase means that the lower court has a range of permissible choices, and that its decision should not be disturbed so long as it stays within that range. *E.g.*, *United States* v. *Dockery*, 955 F.2d 50, 54 (D.C. Cir. 1992); *Barnett* v. *Equitable Trust Co.*, 34 F.2d 916, 920 (2d Cir. 1929) (L. Hand, J.), aff'd as modified, 283 U.S. 738 (1931); compare *Anderson*, 470 U.S. at 574 ("Where there are two permissible views of the evidence, the factfinder's choice between them cannot be clearly erroneous."). Put differently, the appellate court should not reverse a discretionary decision unless it can say that its review of the matter "commands" the opposite conclusion. *Pierce*, 487 U.S. at 570. In the end, however, such phrases can do little more than restate the question of how much discretion the reviewing court is prepared to accord the court reviewed.

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accepted technique or theory, or to whether evidence based on unexceptionable science is sufficiently relevant to the facts of the matter at hand.

In the present context, we think that question is best addressed in light of the considerations of comparative institutional advantage and judicial efficiency discussed above. As this Court emphasized in *Daubert*, 509 U.S. at 597, the object of the overall judicial enterprise is not an "exhaustive search for cosmic understanding," but appropriate delivery of "a quick, final, and binding legal judgment." Naturally, it is also important to strive for "decisional accuracy"; and appellate review on almost any issue will tend to promote that goal. *Salve Regina*, 499 U.S. at 232. But it will promote it only at considerable cost. Courts of appeals should be wary of deciding that they are in a better position than trial courts to evaluate the reliability and relevance of proffered scientific evidence in most cases; and they should be reluctant to undertake an extensive independent review of the issues or record involved.

Moreover, it is appropriate to place considerable responsibility on the parties in this regard. A party proffering (or challenging) scientific evidence in the district court should take care to provide that court with a clear and adequate submission, including copies of relevant materials, that specifically delineates how the evidence meets (or does not meet) the reliability and relevance criteria articulated in *Daubert*. Similarly, on appeal, a party challenging an admissibility decision ordinarily should be able to point specifically and succinctly to a particular analytical error that so fundamentally taints the court's decision as to require reversal. We suspect that parties that have adequately presented their case to the district court will seldom be able to point to such an error on appeal. Parties that have failed to present their case adequately below will not ordinarily merit rescue by the court of appeals.

III. THE DISTRICT COURT DID NOT ABUSE ITS DISCRETION IN EXCLUDING THE TESTIMONY OF RESPONDENTS' EXPERTS

Application of these principles in this case is complicated by the fact that the district court's grant of summary judgment was based only in part on the inadmissibility of expert testimony. An order granting summary judgment is reviewed de novo, resolving all factual questions in favor of the non-moving party. See Pet. App. 4a. Yet, what facts are at issue may materially affect the district court's analysis of proffered scientific evidence.

In this case, the district court ruled that there was a genuine issue concerning Robert Joiner's exposure to PCBs, but no issue with respect to his exposure to furans or dioxins. Pet. App. 44a, 49a, 51a. With respect to furans and dioxins, the court considered the testimony of respondents' experts, but held that it did not suffice to create an issue for trial. *Id.* at 47a-48a, 50a-51a. Thus, the court of appeals' reliance on the experts' testimony in reversing on that issue (*id.* at 14a-16a) did not depend on rejecting any evidentiary ruling made by the district court. Because this Court granted review to consider only the evidentiary question (Pet. i), we assume here that respondents have adequately raised a factual issue concerning Robert Joiner's exposure to furans and dioxins.[11]

[11] For the same reason, we do not suggest that the Court rest its decision on the district court's passing observation (see note 2, *supra*) that it would have granted summary judgment for petitioners even if it had not excluded the scientific evidence proffered by respondents. To the extent that observation amounted to an alternative ground for the district court's decision, it presents a materially different issue concerning the standard of appellate review than does the court's admissibility ruling.

The question presented is therefore whether, if we assume Joiner's exposure to PCBs, furans or dioxins, the district court abused its discretion in concluding that the expert opinions proffered by respondents to prove that it is more likely than not that one or more of those substances contributed, to a "reasonable degree of medical certainty," to the early onset of Joiner's small-cell lung cancer were not sufficiently reliable or relevant to be submitted to a jury. See Pet. App. 51a. Respondents proffered two expert opinions on causation, based in each case on the experts' general background and experience and on specific animal and epidemiological studies. See *id.* at 8a-10a, 53a-68a. Taking into account the considerations outlined above, we conclude that the court of appeals should not have disturbed the district court's conclusions in this case.

1. First, the court of appeals was entitled to review for clear errors of fact or law affecting the district court's ruling. Because it reversed the trial court's holding that there was no genuine issue of fact concerning respondent's exposure to furans or dioxins, the court of appeals could properly conclude that it should also reverse the admissibility ruling to the extent that it relied on the observation that the proffered opinions were "inextricably bound up with the experts' assumption that Joiner was exposed to furans and dioxins." Pet. App. 53a; see *id.* at 53a-57a. The ruling that the proffered testimony "manifestly does not fit the facts of this case" (*id.* at 57a) was based on a view of the facts that was clearly incorrect in light of the appellate court's independent ruling on summary judgment, and it therefore cannot remain a permissible ground for exclusion under Rule 702.

The court of appeals implied (Pet. App. 11a-13a) that its reversal of the district court's "reliability" deter-

minations was similarly based on a clear error of law, because the district court misunderstood its role under *Daubert* and improperly focused on the proffered experts' "conclusions" rather than on their "principles and methodology." *Id.* at 13a (quoting *Daubert*, 509 U.S. at 595). That sort of legal error would be a proper ground for reversal under an abuse-of-discretion standard. We disagree, however, with the court of appeals' view that the district court misunderstood its role in this case.

The district court properly recited the basic standards set out in *Daubert*. See Pet. App. 53a, 67a. After thoroughly reviewing the materials cited to it by petitioners and respondents (see *id.* at 53a-67a), the court determined, not that the conclusions urged by respondents' experts were incorrect or inherently implausible (cf. *id.* at 63a n.26), but that the "analytical gap" between those conclusions and the scientific materials on which they purportedly relied was simply "too wide" (*id.* at 67a, quoting *Turpin* v. *Merrell Dow Pharmaceuticals, Inc.*, 959 F.2d 1349, 1360 (6th Cir.), cert. denied, 506 U.S. 826 (1992)), so that they amounted to no more than "subjective belief or unsupported speculation" (*ibid.*). That is precisely the inquiry not only authorized, but mandated, by *Daubert*. See 509 U.S. at 589-590 & n.9 (Rule 702 imposes standard of "evidentiary reliability" and "trustworthiness"; court should not admit expert testimony unless it is "supported by appropriate validation—*i.e.*, 'good grounds,' based on what is known"). If the district court abused its discretion, it did so by reaching the wrong conclusion in its analysis, not by misunderstanding or stepping outside the "gatekeeping" role assigned to it by *Daubert*.

2. For the same reason, this is not a case in which the district court failed to exercise its discretion.

Nor is it a case in which it would have been appropriate for the court of appeals to pronounce categorically on a particular scientific evidentiary issue, and the court did not purport to do so. Thus, of the criteria for appellate decision that we have identified, there remains only the question whether the district court abused its discretion by concluding that the proffered testimony of respondents' experts as to causation was not sufficiently reliable to be admitted and considered by the jury.

We think the trial court's conclusion was a permissible one. With respect to studies showing the development of cancer in mice exposed to PCBs, the court noted (Pet. App. 59a, 61a) that the two cited studies were "preliminary" in nature, and showed only that "massive doses" of PCBs, injected directly into the peritoneum or stomach of suckling mice that had been previously dosed with a known initiating carcinogen, could promote the development of dose-dependent tumors of a type different from the small-cell carcinoma found in respondent Joiner's lungs. In attempting to answer these concerns, respondents "addresse[d] the question of reliance on animal studies in general, not the deficiencies that [petitioners] * * * highlighted in the experts' reliance on the animal studies at issue here." *Id.* at 62a. In the absence of an adequate supplementary showing (compare *id.* at 62a n.25) demonstrating, at a minimum, (i) that human beings behave similarly to the tested animals when exposed to a potential carcinogen and (ii) that there was some basis for extrapolating from the high dosage tested in the animal studies to the much lower exposure levels that might actually have been shown by the evidence in this case, the district court could reasonably hold that causation opinions based primarily on these studies were not sufficiently

reliable to be admitted. See *In re Paoli R.R. Yard*, 35 F.3d at 743 ("there must be good grounds to extrapolate from animals to humans").

Similarly, after carefully reviewing (Pet. App. 63a-67a) the epidemiological evidence provided to it by respondents in opposing petitioners' motion for summary judgment (see *id.* at 62a-63a), the court concluded (*id.* at 67a) that the cited materials could not support the opinions proffered by respondents' experts on the ultimate issue of causation in this case. The district court questioned the support provided by a study on cancer mortality among capacitor workers, for example, because the study itself found "no grounds for associating lung cancer deaths * * * and exposure in the plant," cautioned that "[t]he numbers were small, [and] the value of the risk estimate was not statistically significant," and suggested only "the plausibility of a carcinogenic action." *Id.* at 63a & n.26. Another study showed no statistically significant effect on mortality from lung cancer (*id.* at 64a), while a third showed an increase in lung-cancer deaths but had nothing to do with PCB exposure (*id.* at 64a-65a). The remaining study cited by respondents evidently did not control for cigarette smoking or other relevant variables, involved PCB, furan and dioxin contamination of rice oil used to cook food in Japan, and was characterized by one of respondents' own experts as "suggestive" but "not very convincing." *Id.* at 65a-66a.

The court of appeals criticized the district court's ruling on the grounds that the lower court (i) mentioned the low number of animal studies, (ii) "f[ound] research unreliable solely because it use[d] animal subjects," (iii) specifically discussed only a limited number of studies cited by respondents' experts, and (iv) impermissibly "excluded the testimony because

[the court] drew different conclusions from the research than did each of the experts," who were well qualified, and each of whom maintained that he had used "scientifically reliable methods" in reaching his proffered opinion on causation. Pet. App. 10a-13a. The district court's opinion makes clear, however, that it neither placed undue weight on the mere number of a particular type of study (see *id.* at 58a, 61a) nor thought all animal research unreliable (*id.* at 60a-62a). The court discussed the studies specifically cited to it by respondents in opposing summary judgment (see *id.* at 62a), and the court of appeals did not identify any other study providing more substantial support for respondents' position.[12]

Finally, in our view, the district court did not reject the proffered evidence because it drew a "different" conclusion from the evidence than did respondents' experts, but because it concluded that the experts' conclusion was one that could not properly be drawn for purposes of determining the evidentiary issue in this case. See Pet. App. 67a ("[T]he court is not persuaded * * * that the studies support the 'knowledge' the experts purport to have, i.e., that PCBs, 'to a "reasonable degree of medical certainty,"' * * * promote small cell lung cancer in humans."). That is a permissible conclusion under *Daubert*. The court of appeals, on the other hand, appears to have focused, rather uncritically, on the qualifications of respondents' experts and their own assertions that

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[12] The court of appeals impliedly criticized the district court for deciding the admissibility issue without having before it actual copies of most of the studies it discussed. Pet. App. 13a n.9. As the district court noted (*id.* at 59a n.23, 63a n.27), however, it had before it what the parties chose to provide. While the court certainly had the authority to seek more information, it had no obligation to do so.

their methods and opinions were reliable. See. *id.* at 8a-10a & n.8, 11a.

A district court should not base admissibility of expert testimony on whether it thinks that the testimony is probably right or probably wrong. It must, however, exclude such testimony if it concludes that the basis for the expert's opinion is so unclear or inadequate that it is *mere* opinion—however well informed—rather than testimony concerning scientific "knowledge" that will be "helpful," rather than misleading, to the jury under Rule 702. Compare Fed. R. Evid. 403 (balancing probative value and undue prejudice); *Daubert*, 509 U.S. at 589-590, 595.[13] For the reasons we have discussed, we think the district court acted within the appropriate bounds of its "gatekeeping" role under *Daubert*, 509 U.S. at 597, in determining that the "analytical gap" (Pet. App. 67a) between the materials cited by respondents and the expert opinion they proposed to offer the jury on the issue of causation was too large to be bridged by the *ipse dixit* of their experts, no matter how qualified those experts were. Even if reasonable minds might differ on that issue, the district court would not have abused its discretion in reaching one of two permissible conclusions. Its decision therefore should not have been disturbed on appeal.

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[13] As Chief Judge Posner has put it, the district judge must determine whether the evidence proffered is "genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist." *Rosen* v. *Ciba-Geigy Corp.*, 78 F.3d 316, 318 (7th Cir.), cert. denied, 117 S. Ct. 73 (1996).

CONCLUSION

The judgment of the court of appeals should be reversed.

Respectfully submitted.

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